

PATENT APPLICATION

IN THE U.S. PATENT AND TRADEMARK OFFICE

September 28, 2011

Applicants: Anthony McCORMACK et al  
For: TOBACCO SMOKE FILTER  
Serial No.: 10/576 659                      Group: 1747  
Confirmation No.: 4367  
Filed: February 2, 2007                      Examiner: Felton  
International Application No.: PCT/GB2004/004418  
International Filing Date: October 19, 2004  
Atty. Docket No.: 3700.P0412US

**APPELLANTS' BRIEF ON APPEAL**

Sir:

This is an appeal from the decision of the Examiner dated April 28, 2011 finally rejecting Claims 1, 27-32, 34 and 38-48.

REAL PARTY IN INTEREST

Filtrona International Limited is the assignee of the present application and the real party in interest.

RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences with the present application.

STATUS OF CLAIMS

Claims 1, 27-32, 34 and 38-48 are pending and are the claims under consideration on appeal. Claims 2-26, 33 and 35-37 have been canceled.

#### STATUS OF AMENDMENTS

There have been no amendments filed after the final rejection dated April 28, 2011.

#### SUMMARY OF CLAIMED SUBJECT MATTER

Appellants' invention, as defined by independent Claim 1, is directed to a tobacco smoke filter having an extended life (specification page 7, first full paragraph) and including activated carbon impregnated with a metal impregnant (specification page 5, second full paragraph, numeral "17" in Figures 1 and 2), wherein the activated carbon is high-activity activated carbon (specification page 4, fourth paragraph) having an activity of greater than 90% CTC (specification page 4, sixth paragraph) prior to impregnation and substantially all of the activated carbon is of a particle size between 0.6 mm and 0.212 mm (specification page 5, third full paragraph).

Appellants' invention, as defined by independent Claim 32, is directed to a tobacco smoke filter having an extended life (specification page 7, first full paragraph) and including activated carbon which is impregnated with copper and molybdenum (numeral "17" in Figures 1 and 2 and specification page 6, first full paragraph), wherein the activated carbon is a high-activity activated carbon (specification page 4, third full paragraph) having an activity of greater than 90% CTC (specification page 4, fifth full paragraph) prior to impregnation and substantially all of the activated carbon is of a particle size between 0.6 mm and 0.212 mm (specification page 5, third full paragraph).

Appellants' invention, as defined by independent Claim 44, is directed to a tobacco smoke filter having an extended life (specification page 7, first full paragraph), and including high-activity activated carbon (specification page 4, third full paragraph) having an activity of greater than 95% CTC (Sample Reference No. 3 in Table 3 on page 11 of the specification) prior to impregnation and impregnated with 1-5 wt.% of copper

and molybdenum (numeral "17" in Figures 1 and 2 and specification page 2, last paragraph), based on the dry weight of the activated carbon (specification page 4, last paragraph), wherein the ratio of copper to molybdenum is greater than 1.3 to 1 (first full paragraph on page 4 of the specification).

#### GROUND OF REJECTION TO BE REVIEWED ON APPEAL

The first ground of rejection to be reviewed on appeal is whether Claims 1, 27-32, 34 and 38-48 are unpatentable under 35 USC 112, first paragraph, as failing to comply with the written description requirement.

The second ground of rejection to be reviewed on appeal is whether Claims 46-48 are unpatentable under 35 USC 112, first paragraph, as failing to comply with the written description requirement.

The third ground of rejection to be reviewed on appeal is whether Claims 1, 27-32, 34 and 38-48 are unpatentable under 35 USC 112, second paragraph, as being indefinite.

The fourth ground of rejection for review on appeal is whether Claims 1, 27-32, 34 and 38-48 are unpatentable under 35 USC 103(a) over Keith II et al in view of Crooks et al.

#### ARGUMENT

The invention under consideration on appeal is directed to a tobacco smoke filter having an extended life and contains activated carbon impregnated with a metal impregnant. The activated carbon is high-activity activated carbon having an activity of greater than 90% CTC prior to impregnation and substantially all of the activated carbon has a particle size between 0.6 mm and 0.212 mm. The present invention is based on the discovery that a tobacco smoke filter made of activated carbon having an activity of greater than 90% CTC prior to impregnation and having a particle size of between 0.6 to 0.212 mm and which is then impregnated with a metal impregnant

unexpectedly exhibits a high selectivity with respect to the removal of hydrogen cyanide from tobacco smoke, has an extended shelf life and yet does not show a marked degree in performance although it contains a lower level of metal impregnation. The tobacco smoke filter of the present invention has an unexpectedly high efficiency in removing undesirable vapor phase components as well as reducing the content of hydrogen cyanide. It is respectfully submitted that the presently claimed invention is patentably distinguishable over the prior art cited by the Examiner.

REJECTION OF CLAIMS 1, 27-32, 34 AND 38-48

UNDER 35 USC 112, FIRST PARAGRAPH,

AS FAILING TO COMPLY WITH THE WRITTEN DESCRIPTION REQUIREMENT

The Examiner has objected to the limitation "having an extended life" being added to the claim because it "does not appear to have been described in the specification". Support for this language is found in the first full paragraph on page 7 of the specification where it is stated that "This has the result that the efficiency with which the known filters remove HCN also decreases on ageing. Surprisingly, the ability of filters according to the invention to remove HCN does not deteriorate significantly even after storage for prolonged periods (e.g. six months)." One of ordinary skill in the art would easily arrive at the conclusion that this means that the tobacco smoke filter of the present invention has an extended life as recited in the claims.

REJECTION OF CLAIMS 46-48 UNDER 35 USC 112, FIRST PARAGRAPH,

AS FAILING TO COMPLY WITH THE WRITTEN DESCRIPTION REQUIREMENT

The Examiner has objected to the limitation "wherein the activated carbon has an activity of greater than 100 to 125% CTC" as being not disclosed in the specification. Support for the lower limit of greater than 100% CTC can be found in the

last sentence on page 3 of the specification where it is stated that "More preferably the activity of the activated carbon is greater than 100% prior to impregnation" and support for the upper limit of 125% CTC is provided by Sample Reference Nos. 15 and 16 in Table 3 on page 11 of the specification and by the decision in *In re Wertheim*, 541 F2d 257, 191 USPQ 90 (CCPA 1976), which is discussed in MPEP 2163.05 III.

REJECTION OF CLAIMS 1, 27-32, 34 AND 38-48

UNDER 35 USC 112, SECOND PARAGRAPH

Claims 1, 27-32, 34 and 38-48 have been rejected under 35 USC 112, second paragraph, as being indefinite for containing the term "extended". The word "extended" means "drawn out in length especially of time". The first full paragraph on page 7 of the specification provides support for this limitation. There is no requirement that Appellants' specifically state as to what period of time constitutes "extended". Given the clear meaning of the word "extended", especially in light of the context of the present specification, this rejection clearly is in error and should be reversed.

REJECTION OF CLAIMS 1, 27-32, 34 AND 38-48

UNDER 35 USC 103(a) AS BEING UNPATENTABLE OVER KEITH II ET AL  
IN VIEW OF CROOKS ET AL AND FRUND

The Keith II et al reference is directed to a process of impregnating adsorbent materials with metal oxides and discloses cigarette filters which are impregnated with about 0.5 to 13% by weight and more preferably, 4 to 6% by weight of an oxide of a metal selected from the group consisting of cobalt, copper and zinc. As admitted by the Examiner, there is no disclosure in this reference with respect to the activated carbon of Keith et al specifically disclosing an activity of greater than 90% CTC prior to impregnation as required by the currently presented claims.

The Examiner has also stated that Appellant appears to be arguing the reference separately as he has admitted on the record that Keith II et al does not disclose the activity claimed. However, since Keith II et al is the primary reference cited by the Examiner and the reference closest to the presently claimed invention, it is only necessary for Appellants to show unexpected results as compared to this reference. The Examiner is combining Keith II et al with two other references and there is no way that Appellants can show unexpected results over Keith II et al combined with Crooks et al and Frund since each of these references only disclose a part of the present invention and are pieced together to show the invention as a whole. As will be discussed below, the test data of record in the present application clearly is sufficient to establish the patentability of the presently claimed invention.

As discussed previously, the instant invention is based on the discovery that activated carbon having (1) an activity above 90% CTC, (2) a specific metal content amount and (3) a specific range of mesh size provides both a selective hydrogen cyanide reduction and a surprising retention of performance over a period of time. This is demonstrated in Table 3 in the present specification where the Examples of the present invention will correspond to sample numbers 5-8, 11-13, 15 and 27, which all include the appropriate level of metal impregnant, copper of at least 90% CTC and substantially all of the activated carbon is of a particle size between 0.6 mm (30 mesh) and 0.212 mm (70 mesh), exhibit a significantly superior hydrogen cyanide reduction in the 87-93% region.

In contrast thereto, comparative sample reference number 3 contains carbon having an activity of 95% CTC but does not contain a metal impregnant. It illustrates an acceptable VP reduction but the hydrogen cyanide reduction is only 75%. Comparative sample reference numbers 1, 2 and 10, which have a lower activity of 80% and 83% CTC, clearly exhibit an inferior

VP reduction and selective reduction of hydrogen cyanide. Comparative sample numbers 14 and 16 contain a metal impregnant and carbon having a CTC of 90% or greater but have a rather poor hydrogen cyanide reduction due to the larger mesh size which is excluded from the present claims. Moreover, Table 5 shows that the Examples of the present invention, illustrated by Examples 8 and 11, unexpectedly retain their performance over an extended period of time as long as six months. This is clearly not expected in light of the prior art cited by the Examiner. With respect to Comparative sample reference 9, which has a carbon activity of 80% CTC and yet exhibits an extremely high selectivity for hydrogen cyanide, this is believed to be an anomaly or error and it would be expected that the activated carbon of this reference sample would not retain this performance over a six month time period. In general, high selectivity for hydrogen cyanide is not exhibited in activated carbons of less than 90% CTC.

As stated previously, the Keith reference is directed to a cigarette filter containing activated carbon which can be impregnated with from about 0.5 to 14% by weight of an oxide of a metal selected from the group consisting of cobalt, copper, zinc, iron, silver and molybdenum, either singly or in combination. Although Keith discloses the use of activated carbon, the activated carbons used in this reference do not have a high activity.

In the claims of Keith, the carbon is disclosed as being a carbon of at least 1 million square centimeters per gram ( $100\text{m}^2/\text{g}$ ) and column 2, line 52 of this reference refers to a "good grade" having a surface area of in excess of  $500\text{ m}^2/\text{g}$ . There is no other measure disclosed in this reference which relates to the activity of the carbon. Coconut shell carbons have a reasonably well known relationship between surface area and CTC activity. This relationship shows a surface area of  $500\text{ m}^2/\text{g}$  corresponds to 30% CTC. An activity of at least 90% CTC, as

required by the present claims, corresponds to a surface area of 1,500 m<sup>2</sup>/g for activated carbon provided from coconut shell carbons. In Keith, the experiments only use BPL carbons supplied by Calgon Carbon. The manufacturer of this carbon shows it to have a butane activity of 23.3% which is equivalent to about 60% CTC. Therefore, there is no disclosure in this reference of a "high-activity" activated carbon having activity greater than 90% CTC prior to impregnation as required by the present claims or discloses the unexpected benefits associated with the tobacco smoke filter of the present invention.

The claimed requirement that the "activated carbon have an activity greater than 90% CTC" is not an artificial or arbitrary value but, as set out on page 3, last paragraph, of the present specification, is a generally understood term of art indicating that the activated carbon has a "high activity".

The Crooks et al reference is directed to a filter element having an absorbent material incorporated therein. The Examiner has stated that this reference discloses a cigarette filter that includes activated carbon that is impregnated with metals, with the activated carbon having a carbon tetrachloride activity of 60-150. However, there is no disclosure in this reference that any particular advantage would be gained by an activated carbon having an activity between 60% and 150% as all of the activated carbons in this range are shown as being equivalent and, in fact, the activated carbons exemplified have a CTC of 85%. Given the equivalency between activated carbons having an activity between 60% and 150% in Crooks, one of ordinary skill in the art would only understand from this reference that any activated carbon is effective in accomplishing the purpose of this reference and high activity activated carbon is not needed. As such, this reference in fact teaches away from the high activity activated carbon of a specified mesh size together with a specified amount of metal impregnant to give an unexpected



remarkable selectivity for hydrogen cyanide in a tobacco filter which unexpectedly does not deteriorate over time.

The Frund reference is directed to a respirator filter system used in filtering toxic agents, including organic vapors, acid gases, formaldehyde, ammonia, methyl amine and pesticides. As previously discussed, activated carbons used in respirators are not suitable for use in cigarette filters because they require a longer contact time and do not have any selectivity with respect to the other vapor components contained in tobacco smoke. There is no suggestion in this reference that the activated carbon used there in a respirator filter system could also be used in a cigarette filter. Therefore, only hindsight provided by the present disclosure is providing the motivation to the Examiner to combine the references in the manner done here in order to try to make a showing of prima facie obviousness under 35 USC 103(a).

In Table 1 on page 9 of the present specification, comparative impregnated commercial carbons were examined for the removal of hydrogen cyanide and undesirable vapor phase component removal. As shown in Table 1, the standard cigarette filter which included an unimpregnated activated carbon had a vapor phase component reduction of 55% and a hydrogen cyanide reduction of 44%. In contrast thereto, in Table 3 on page 11 of the present specification, Sample Nos. 1, 2, 9 and 10 all fall within the scope of Keith II et al in that they disclose an activated carbon impregnated with copper and molybdenum. As can be seen by the results for the vapor phase component reduction percent and hydrogen cyanide reduction percent, none of these comparable samples had both a high vapor phase reduction and hydrogen cyanide reduction as achieved by the samples according to the present invention. That is, Sample Nos. 5-8 and 11-16 all showed both superior vapor phase reduction in combination with hydrogen cyanide reduction as compared to the samples corresponding to Keith II et al. Moreover, newly presented


Claims 46-48 correspond to Sample Nos. 11, 12 and 15 which even show unexpectedly superior properties over other Examples of the present invention. As such, not only is the patentability of the presently claimed invention established over the prior art cited by the Examiner, the patentability of Claims 46-48 is even further established.

#### CONCLUSION

For the reasons advanced above, it is respectfully submitted that the presently claimed invention clearly is patentably distinguishable over the prior art cited by the Examiner and the rejections of the claims under 35 USC 112 are clearly not appropriate. Reversal of the Examiner's rejections is respectfully solicited.

Please credit any overpayment, or charge any additional filing fee required under 37 CFR 1.16 or 1.17 by this communication, to Deposit Account No. 06-1382.

Respectfully submitted,

  
Terryence F. Chapman

TFC/smd

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Encl: Claims Appendix  
Evidence Appendix  
Related Proceedings Appendix

**CLAIMS APPENDIX**

1. A tobacco smoke filter having an extended life and including activated carbon impregnated with a metal impregnant, wherein the activated carbon is high-activity activated carbon having an activity of greater than 90% CTC prior to impregnation and substantially all of the activated carbon is of a particle size between 0.6 mm and 0.212 mm.

27. A tobacco smoke filter according to Claim 1, wherein the metal impregnant is one or more of copper, molybdenum, manganese, cobalt, zinc and iron.

28. A tobacco smoke filter according to Claim 1, wherein the metal impregnant(s) is present in an amount which is not more than 10% of the dry weight of the high-activity activated carbon.

29. A filter according to Claim 28, wherein the metal impregnant(s) is present in an amount which is from 1 to 5% of the dry weight of the activated carbon.

30. A tobacco smoke filter according to Claim 1, wherein the metal impregnant is copper.

31. A tobacco smoke filter containing activated carbon which is impregnated with copper and molybdenum, wherein the ratio of copper to molybdenum is greater than 1.3 to 1.

32. A tobacco smoke filter having an extended life and including activated carbon which is impregnated with copper and molybdenum, wherein the activated carbon is a high-activity activated carbon having an activity of greater than 90% CTC

prior to impregnation and substantially all of the activated carbon is of a particle size between 0.6 mm and 0.212 mm.

34. A filter according to Claim 1, wherein the activated carbon has an activity of greater than 100% CTC prior to impregnation.

38. A filter according to Claim 1, which contains between 10 mg and 150mg of activated carbon.

39. A filter according to Claim 1, which further comprises one or more additional adsorbents.

40. A filter according to Claim 39, wherein the additional adsorbent(s) selectively removes a compound(s) present in the VP fraction of cigarette smoke other than HCN.

41. A filter cigarette comprising a filter according to Claim 1 joined at its upstream end to a wrapped tobacco rod.

42. A filter according to Claim 1, wherein the activated carbon has an activity of greater than 95% CTC prior to impregnation.

43. A filter according to Claim 32, wherein the activated carbon has an activity of greater than 95% CTC prior to impregnation.

44. A tobacco smoke filter having an extended life and including high-activity activated carbon having an activity of greater than 95% CTC prior to impregnation and impregnated with 1 to 5 wt.% of copper and molybdenum, based on the dry weight of the activated carbon, wherein the ratio of copper to molybdenum is greater than 1.3 to 1.

45. A filter according to Claim 44, wherein the ratio of copper to molybdenum is 4 to 1.

46. A tobacco smoke filter according to Claim 1, wherein the activated carbon has an activity of greater than 100 to 125% CTC and is impregnated with copper and molybdenum in a total amount of from 1.25 to 2.5% of the dry weight of the activated carbon and copper to molybdenum ratio of 4:1.

47. A tobacco smoke filter according to Claim 32, wherein the activated carbon has an activity of greater than 100 to 125% CTC and is impregnated with copper and molybdenum in a total amount of from 1.25 to 2.5% of the dry weight of the activated carbon and copper to molybdenum ratio of 4:1.

48. A tobacco smoke filter according to Claim 44, wherein the activated carbon has an activity of greater than 100 to 125% CTC and is impregnated with copper and molybdenum in a total amount of from 1.25 to 2.5% of the dry weight of the activated carbon and copper to molybdenum ratio of 4:1.

**EVIDENCE APPENDIX**

There is no extrinsic evidence relied upon by Appellants in the appeal.

**RELATED PROCEEDINGS APPENDIX**

There are no related proceedings with respect to the present application.